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INTEGRATING ENERGY SERVICES FOR STATE BUILDINGS

An Energy Action Plan for Tennessee Buildings

*Developed in Partnership with
the
U. S. Department of Energy's Rebuild America Program
and the
U. S. Environmental Protection Agency's Energy Star Program*



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**Department of Finance and Administration
Division of the Real Property Administration
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With oversight by Real Property Administration for the
STATE BUILDING COMMISSION
of Tennessee

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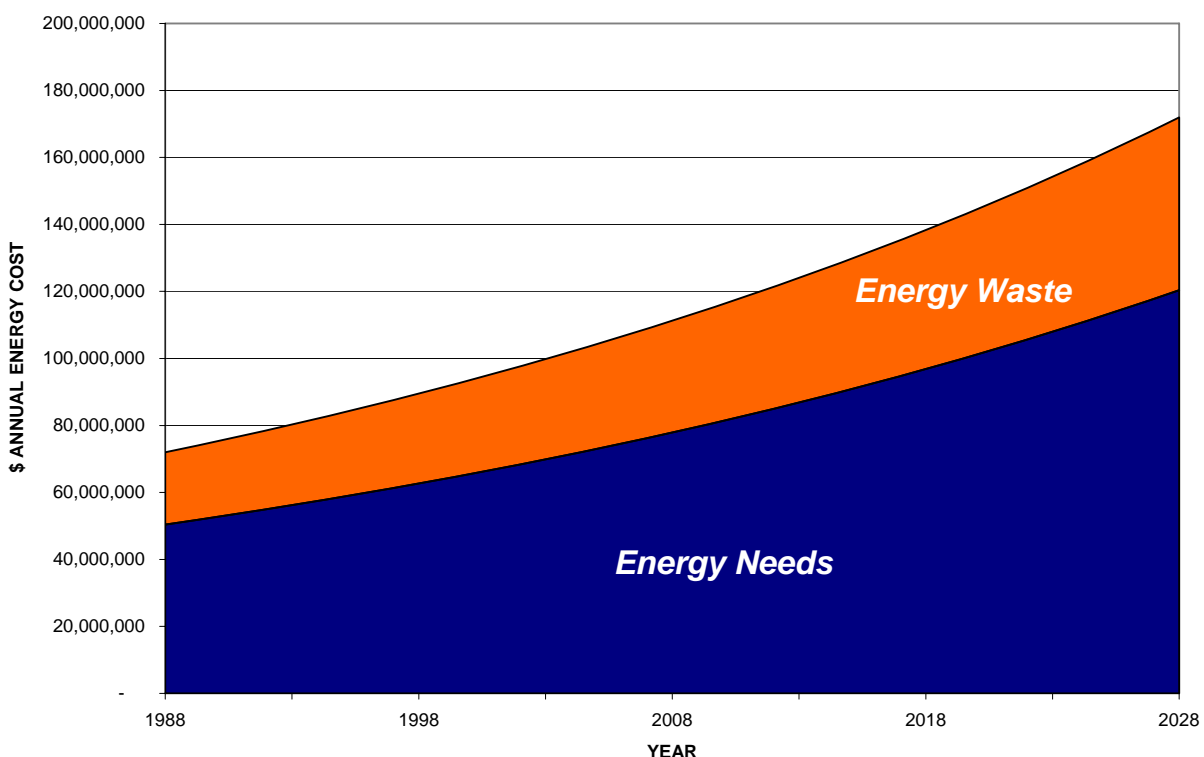
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Overview

The State of Tennessee spent approximately \$72 million for energy to operate state-owned buildings in 1988. In 1998, that annual bill grew to between \$80 and \$90 million. Projected out to the next ten years, at a 2% growth rate, the bill approaches \$120 million. This report summarizes the vision, priorities, goals and organization that, if successfully implemented, will establish an effective, self-funded program to reduce the growth of energy costs and reduce deferred maintenance in State buildings. Specifically, it addresses how the State Building Energy Management Program (SBEM) can provide leadership in a statewide strategic plan that will improve the operation, maintenance, energy efficiency and working environment in all state-owned buildings while reducing energy costs.

STATE BUILDING ENERGY COSTS (2.2% ANNUAL INCREASE)



Plan Objectives

The broad objectives of this plan are:

- **Reduce energy consumption** and costs in State buildings (through energy efficiency / maintenance improvements and operational measures)
- **Retrofit 60 million square feet of state-owned space in 15 years**
- **Maintain current energy budget levels** to fund program activities (budget verified savings back to agencies through the program)

- **Provide performance incentives to agencies and service providers**
- **Reduce or eliminate current deferred (unaccomplished) maintenance** in State buildings
- **Incorporate energy efficiency in the planning and design** of new facilities

A plan of this scope, magnitude and complexity requires careful planning and coordination if it is to be effective and well documented. It is also extremely important that fundamental issues regarding budget and finance are dealt with early in the planning process so that quick payback measures aren't implemented without "capturing" the savings for use later.

An initial screening of building stock should be performed as each agency comes into the program in order to identify those buildings that represent the best candidates for O&M improvements and energy savings renovations. Candidate buildings will be ranked according to the overall priorities and goals as follows: (*note: ✓ indicates objective achieved*)

- **Start-up Objectives:**
 - ✓ - **Identify and select a pilot agency** to test the integrated process outlined here (*Middle Tennessee State University*)
 - **Identify buildings and complete engineering building assessments** for the buildings with the highest energy use within the inventory and commission as appropriate
 - ✓ - **Complete pilot projects** on building commissioning and performance contracting
 - **Establish an incentive** to agencies that will encourage their continued support of the plan (e.g. some share of the savings)
 - ✓ - **Establish standards** for "building commissioning" and energy savings performance contracts (ESPC) (*see Annex C*)
 - **Establish a recognition and awards program** for outstanding achievement of the goals and objectives of the program
 - ✓ - **Develop and approve this plan** for state-wide implementation (*approved August 1999 by the State Building Commission*)
 - ✓ - **Approve a process that can integrate energy services** to all State agencies. Such a process is described in detail as an attachment (Proposed Tennessee Integrated Energy Services Process or T.I.E.S.) In this process, an engineering assessment is the first step from which integrated multi-disciplined energy programs and services are provided to State agencies as appropriate. (*see Annex A*)
- **Mid-term Objectives:**
 - ✓ - **Extend this plan into other state agencies** (*see Current State Agency Partners, page 6*)
 - ✓ - **Begin implementation** of energy conservation savings measures (ECSM's) at partner agencies and report progress (*has begun*)
 - ✓ - **Market the plan** to other State agencies (*in progress*)
- **Longer-term Objectives:**
 - **Adopt and implement this plan state-wide**
 - **Establish a continuing, comprehensive facilities management program** within each State agency that owns or operates buildings to improve the comfort and productivity of building occupants at the least possible energy cost.

Vision / Mission

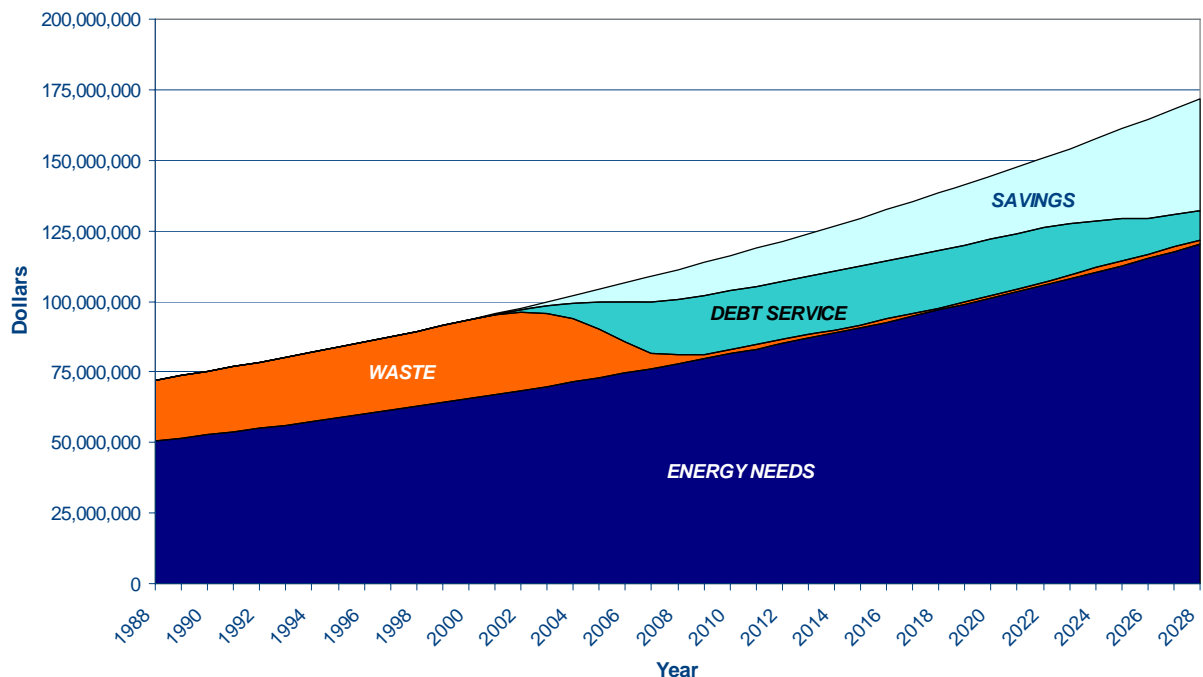
Our vision is that all State buildings provide a safe, comfortable and productive work environment while operating at optimum energy efficiency

Our mission is to introduce, initiate and implement programs that will improve safety, comfort and energy efficiency at all State buildings

Plan Concept

This plan is designed to be self-funded by using the savings generated from facility modifications to provide debt service for the investment capital required to fund the modifications. Under this

**State Building Energy Costs/Savings
1988 - 2028**



concept, verified program savings are provided to the annual agency budgets to pay for debt service, program costs and performance period costs at existing buildings. Any additional savings could be used to fund energy or related projects. Long-term, net savings would accrue to the General Fund. Traditional funding sources will be used to finance energy efficient design and construction of new facilities.

This plan is modeled after the U. S. Department of Energy's (DOE) Rebuild America Program. State agencies will voluntarily become partners in this program through a letter of commitment. Partner agencies will receive technical support, implementation standards, coordination of program resources including DOE and the U.S. Environmental Protection Agency (EPA), and follow-up monitoring and verification of savings from SBEM. A pilot agency will be selected to test the implementation

process and gauge the resource requirements for a more aggressive implementation of the plan statewide.

Attainable, 5 Year Goals

- Achieve an average 30% operational cost saving (\$8,000,000) per year in selected State facilities each year for the first five years of full implementation under Scenario B. (20% net improvement from energy efficiency improvements and 10% savings from related O&M improvements. The following estimates are based upon average energy costs of \$ 1.22/SF/YR for DGS office buildings)
- Achieve environmental pollution reductions equivalent to 4,000 fewer cars
- Implement all appropriate efficiency measures in buildings brought into the plan over the next five years as follows:

Scenario A

This scenario represents a reasonable effort given existing resources and existing level of interest from other state agencies.

Scenario B (*recommended*)

In this scenario, a more aggressive approach will require additional resources to be provided to the program.

Scenario C

This represents a considerably more aggressive approach that also would require additional program resources.

The following table illustrates the significance of these goals on a statewide basis. If these goals are met, the following results are possible, based upon an estimated potential viable square footage of about 60 million square feet (80% of total 72 M SF):

	Goal for 5-yr period	Time to Complete All Viable SF	Attainable with Current Resources
Scenario A	<i>7 million square feet</i>	39 years	Yes
Scenario B	<i>20 million square feet</i>	15 years	No
Scenario C	<i>30 million square feet</i>	10 years	No

Organization

A partnership has been formed between the State Building Energy Management Program, the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA) for the purpose of developing and implementing this plan. Other State agencies will become vital partners in the implementation process. The primary authority for this plan is the State Building Commission with plan leadership and administration provided by the State Building Energy Management Program (SBEM). State agencies should appoint a full-time energy manager with primary responsibility for coordinating all agency activities with the “management team”. DOE under their Rebuild America Program, and EPA under their Energy Star Buildings Program will provide technical and other vital program resources including: software tools, implementation planning assistance, marketing

resources, public recognition of partners and many others. Other “Rebuild” (DOE) and “Energy Star” (EPA) partners in the state (for example Middle Tennessee State University, and the Department of Corrections) will provide additional program development support as pilot agency partners.

Current State Agency Partners:

AGENCY / CAMPUS	SQUARE FOOTAGE
Department of General Services	5,000,000
Tennessee Board of Regents	25,439,850
University of Tennessee System	18,503,400
Department of Environment & Conservation	1,330,200
Tricorp (Dept. of Corrections industry)	8,200
SUB-TOTAL	50,281,650

Prospective State Agency Partners:

AGENCY / CAMPUS	SQUARE FOOTAGE
Department of Correction	4,971,300
Wildlife Resources Agency	65,000
TN School for the Blind	630,000
SUB-TOTAL	5,666,300

Steps to Success

The following logical steps are all equally vital to the successful implementation of the plan and should be completed in sequence as each new agency is brought on board:

1. **Establish a statewide standard energy accounting system** to identify and report energy consumption and costs at all state facilities.
2. **Establish facility specific energy management plans** at all state facilities to improve the energy efficiency and reduce operational costs. These plans should be based upon guidance given in the State Building Energy Management Handbook, Second Edition, 1996 published and provided by the Department of Finance and Administration’s State Building Energy Management Program. These plans will focus on operations and maintenance measures as-well-as low-cost / no-cost energy efficiency measures.
3. **Perform agency needs assessments** of the agency’s management and engineering capability and building inventory. Using assessment tools developed by U.S. Department of Energy (DOE), and the U.S. Environmental Protection Agency (EPA), and the State Building Energy Management Program (SBEM), estimates of savings potential and implementation costs will be prepared for the gross square footage targeted by new partners. This step also serves to establish verifiable baselines for comparisons that will determine resulting savings. The assessments are intended to provide the following information:

- Agency technical support needs
 - Annual energy use and demand for the selected buildings
 - Inventory of building systems and major equipment and current condition
 - Highest energy use equipment of groups of equipment
 - Building operational schedules
 - Major maintenance and operational problems
 - Potential energy efficiency retrofits and associated costs and savings
4. **Utilize standard energy savings performance contracts (ESPC's)** as approved by the State Building Commission. Performance contracting is perhaps the most significant tool available to the State in implementing this plan. It can effectively guarantee successful accomplishment of the plan's goals and objectives. The State Building Commission has approved standard documents and a standard process. The State Building Energy Management Program can provide assistance in implementing and monitoring this process.
 5. **Select and prioritize buildings** for repairs, tune-up and retrofit. In this step, managers wisely select which buildings to include in the program and what priority each selected building should have in the competition for valuable program resources.
 6. **Perform operational repairs and tune-up** energy consuming systems based upon the facility energy plan established under step number two above. It is during this step that an appropriate commissioning of existing building systems is completed. Building commissioning (Cx) is a process that insures that buildings perform as they were intended. For a more detailed discussion of commissioning and Tennessee's efforts to date, see Annex C of this plan.
 7. **Perform detailed engineering studies**, if warranted by the engineering assessment and the commissioning activities. Such studies will clearly establish the potential costs and savings from major energy management retrofits as part of an energy savings performance contract (ESPC); or, they may simply become the engineering / design phase for more traditional energy management retrofit projects (still performance oriented).
 8. **Complete all economically feasible energy management retrofits.** This step also includes building operator training for maintenance and operational requirements of new systems and controls.
 9. **Monitor and verify results (savings)** and report to management. If an ESPC has resulted, it will also include ongoing operations and maintenance support and follow-up for the duration of the contract period.
 10. **Perform annual checkup inspections** to verify new performance efficiencies are being maintained.

Essential Elements of the Plan

Agreements

There must be documented commitments from all partners in the form of executed agreements, an executive order or legislative mandates.

Authority

Under the broad authority of the State Building Commission and the Administration, plan administrators and facility managers need the program and budget authority to make decisions regarding appropriate changes in the long-term maintenance and operation of their facilities.

Management

Qualified energy managers are needed to ensure that accurate performance “baselines” and operational needs are established at each building under the plan. Building systems should then undergo an appropriate level of commissioning to ensure that building energy systems perform at their best before evaluations of energy efficiency retrofit options are completed. Neither the prospective agencies nor the State Building Energy Management Program currently have the existing resources/expertise to implement a significant program statewide.

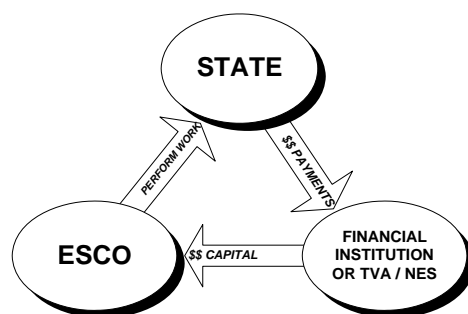
There also must be documented commitments from all partners in the plan. All partner agencies will commit in writing to support and participate in the Tennessee Action Plan. Partners will identify a full-time, qualified energy manager who will coordinate agency activities with the State Building Energy Management Program (SBEM). With assistance from SBEM, each agency will prepare a plan for their agency including measurable goals and objectives that support the State plan. Finally, partners agree to provide SBEM follow-up information on project status, savings achieved and overall program status.

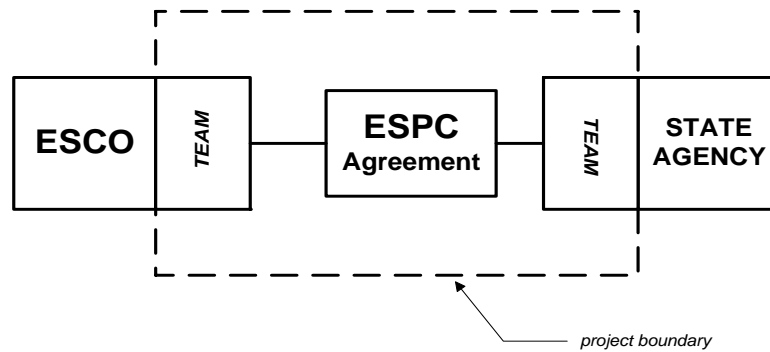
Performance

Performance contracting is perhaps the single most important element of this plan as it can provide a significant statewide impact by providing projects that “work” while not requiring large amounts of up-front capital.

Performance contracting is one of those things that sounds too good to be true. A building owner can increase energy and operational efficiency without making any initial capital investment. An owner (the state) can decrease energy, operating and maintenance costs and simultaneously reserve available capital for other needs, or be able to complete such projects that could not otherwise be completed because of lack of funds. This last option is the most attractive benefit of performance contracting to State and local governments with growing deferred maintenance lists.

Performance contracting is now an approved procurement process in many state governments including Florida, Ohio, Maryland, California and others, because it can be a win-win situation. Everyone comes out ahead - business, government and the taxpayer. Under such agreements, a third party (energy services company “ESCO”) provides a service package that typically includes the





financing, engineering, installation and maintenance of energy-saving capital improvements.

The customer uses the resulting energy savings to pay for the improvements.

The State Building Energy Management Program has reviewed in some detail how the Federal Energy Management Program (FEMP), and other states use performance contracting to accomplish major energy management retrofit projects. Also, Oak Ridge National Laboratory (ORNL) is using the “Super ESPC” approach in creative ways that provide improved competition and eliminates much of the “mystery” associated with performance contracting.

Based on this work, Tennessee has developed and proposed standards for the use of performance contracting with the following characteristics:

1. Program is based upon the FEMP Energy Savings Performance Contract model
2. Features indefinite delivery, indefinite quantity (IDIQ) type of contract and best value procurement
 - a) General ordering agreement for energy products and services only (no projects awarded at time of selection of ESCO’s)
 - three evaluation criteria including: pricing model (using contractor margins), qualifications and past performance addressed in a written proposal, followed by an oral presentation / interview with the evaluation team
 - b) Bilateral task orders to establish projects, clearly defining owner and ESCO requirements, with the following elements:
 - Scope of energy saving measures
 - Operations and maintenance requirements
 - Health, safety and environmental issues
 - Energy baselines for each project
 - Measurement and verification requirements
 - Acceptable economic terms
 - Other project specific requirements

The diagram above, illustrates the relationships established between the owner agency and the ESCO through the performance contract. Once the Super ESPC contract is awarded, the technical and administrative team for both the State agency and the ESCO collaborate under the terms of the contract to develop a scope of work for each individual project and specific requirements that will be issued as Delivery Orders.

Even when ESPC's are not utilized, specifications for procurement of energy projects and services should be "performance based" to insure that the program achieves the desired results.

Following is a table including examples of products and services that can be provided under the plan:

- | | |
|--|---|
| • <i>Energy efficient lighting</i> | • <i>indoor air quality analysis</i> |
| • <i>HVAC maintenance & repair</i> | • <i>modernize temperature controls</i> |
| • <i>HVAC automation</i> | • <i>high efficiency heat pumps</i> |
| • <i>thermal storage systems</i> | • <i>ground source heat pumps</i> |
| • <i>lighting controls</i> | • <i>variable speed drives</i> |
| • <i>training services</i> | • <i>energy efficient motors</i> |
| • <i>boiler modernization</i> | • <i>chiller modernization</i> |
| • <i>commissioning services (Cx)</i> | • <i>advanced utility metering</i> |

See Annex D for a detailed discussion of performance contracting and draft guidelines.

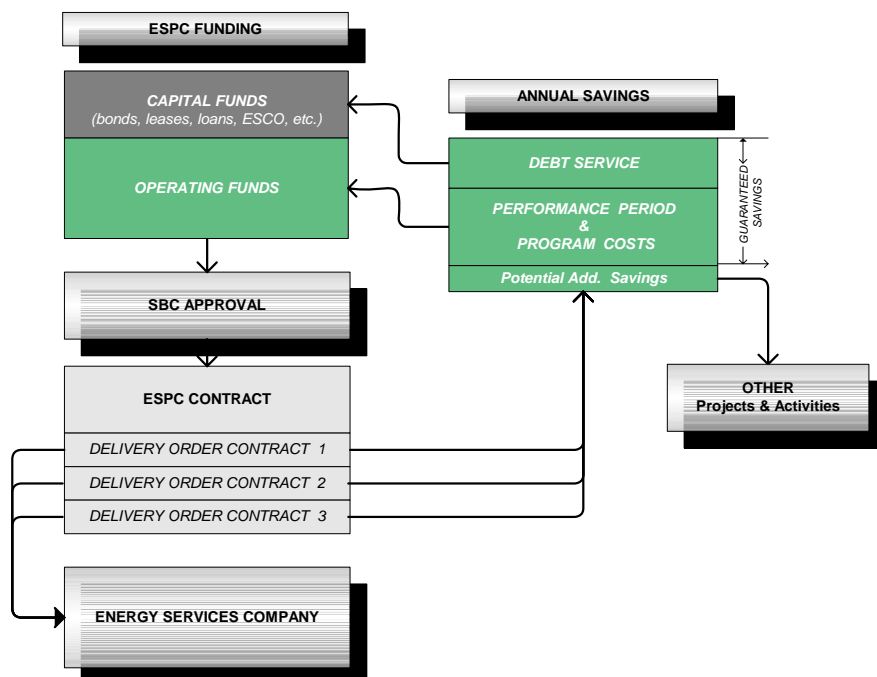
Energy Savings Performance Contracts can provide the resources and expertise to accomplish a significant energy retrofit effort statewide in a relatively short period of time.

Guaranteed Savings

Performance contractors can guarantee the energy savings resulting from implementation of energy cost savings measures (ECSMs) and operations and maintenance (O&M) measures. This insures that the savings are real and available to the program. These guarantees can be provided to the State where the risk of not achieving the desired savings is high and the cost of the guarantees is reasonable.

Approved Energy Specific Budget Policy

Specific new budgetary policy has been established with respect to the accounting for and utilization of savings generated by the plan. When developing and implementing energy efficiency projects in State buildings, including the use of Energy Savings Performance Contracting (ESPC), the energy related cost savings must be made available for use as the payment source for specific project and program related costs throughout the debt-service period of the projects. Any additional savings

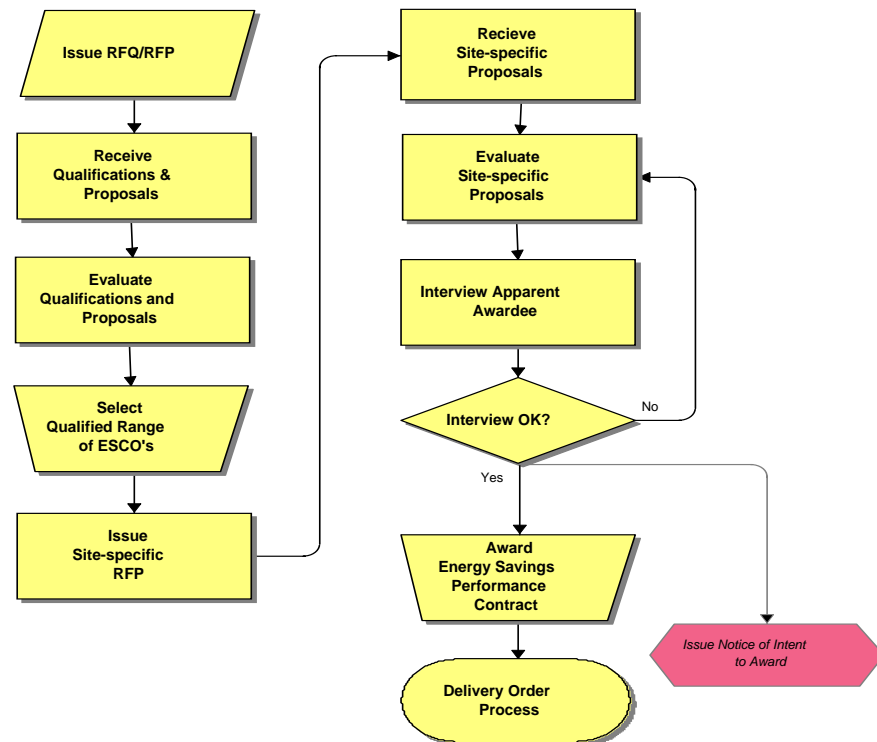


could be made available for use in implementing additional energy and related deferred maintenance projects at State buildings.

Standard Procurement Process

A standard Request for Proposal (RFP) process and language has been established for acquiring, utilizing and guaranteeing multi-disciplined performance from qualified energy service companies (ESCOs). This process is based upon a competitive evaluation of qualifications and proposals from qualified ESCOs. (see chart below)

Energy Savings Performance Contract (ESPC) RFQ - RFP Process



Resources

EPA Energy Star Buildings

The State has signed on as a partner in the U. S. Environmental Protection Agency's voluntary Energy Star Buildings program. In the program, partners focus on reducing energy consumption and improving building performance by using new high-efficiency energy technologies. EPA asks its partners to prioritize projects based upon profitability by using a five-stage energy upgrade strategy that leads to maximum savings, prevents over-sizing of heating and cooling equipment, and minimizes capital costs. A public commitment from the Administration when we begin implementation can provide the motivation and public support of the program required to make it successful.

EPA offers financing options, software, educational workshops, unbiased technical support, actual case studies on buildings of all sizes and improved opportunities to share information with other partners. The EPA will also publicly recognize the state's environmental leadership and assist in promoting successful projects at State facilities. Following is a summary of the Memorandum of Understanding (MOU) that establishes the partnership with EPA.

Buildings MOU in Brief

ENERGY STAR Buildings participants sign a Memorandum of understanding (MOU) with EPA agreeing to improve the overall energy efficiency of their facilities through the implementation of a comprehensive set of profitable upgrades. EPA assists participants by providing technical and administrative assistance to ensure maximum energy savings while satisfying cost-effective criteria.

Partner Responsibilities

The ENERGY STAR Buildings Partner agrees to:

- Survey and implement all profitable upgrades in one Pilot Building within 2 years
- Complete full-building upgrades where profitable in at least 50% of remaining qualifying space and lighting upgrades in remaining 40% within 7 years (qualifying space is conditioned space that is owned or financially controlled by the Partner)
- Maintain or improve indoor air quality in upgraded ENERGY STAR Buildings
- Partners are encouraged to follow EPA ENERGY STAR Buildings staged approach to upgrades, or at a minimum account for inter-system effects
- Adhere to ENERGY STAR energy-efficiency and profitability criteria when replacing failed or retired equipment during the term of the MOU
- Annually report progress to EPA
- Develop an employee outreach program entailing the ENERGY STAR Buildings program goals and results and your pollution prevention accomplishments
- Allow EPA to use your results to promote EPA pollution prevention programs

EPA Responsibilities

EPA Agrees to:

- Provide technical support, including written materials and guides, and a technical hotline
- Provide software tools to aid in estimating energy savings and environmental benefits from specific upgrades (i.e. variable speed drives, fan systems)
- Advise and assist partners in planning and implementing the upgrades
- Provide marketing resources, such as posters and fact sheets, to help Partners communicate the ENERGY STAR Buildings program within their organizations
- Create an Ally Program of equipment manufacturers and distributors, contractors, utility companies, and building technology experts
- Publicly recognize Partners for their participation and publicize their successes
- Provide special recognition for those buildings that achieve the greatest energy-use reductions
- Allow Partners to use EPA's ENERGY STAR logo to publicize their participation in the program

Available Resources

Current resources available to implement this plan include:

- the State Building Energy Management Program, F&A Real Property Administration
- Building Management Staff at participating agencies

- the Facility Revolving Fund (FRF)
- the State Energy Management Fund
- Energy Management Loan Fund
- Rebuild America Partners (Oak Ridge National Labs, MTSU, PECO, others)
- EPA Energy Star Buildings program
- Agency O & M Budgets (including utilities)
- TVA, Energy Services Group and Power Distributors, utility services
- Private sector Energy Service Companies (ESCO's)

Future Resources:

- Savings generated from completed EM retrofit projects
- Enhanced staffing support for the program (data and technical)
- Enhanced staffing support at each participating agency (full-time coordinator)

Expected Benefits

The State will benefit from more efficient buildings, increased productivity of employees due to improved living and working environments, reductions in the number of employees / contracts for operation and maintenance from improved maintenance conditions (saves money). In addition, this can be accomplished with little or no internal capital funds.

Direct benefits to State agencies include:

- Reducing energy consumption will reduce rising energy costs and environmental pollution.
- Leveraging current program resources through improved coordination of activities will produce “more bang for the buck”.
- Unaccomplished maintenance needs can be reduced or eliminated
- Improving the monitoring and follow-up of efficiency upgrade projects will ensure program success.
- Improving the operation and maintenance of state buildings will reduce the number of emergency repairs and reduce costs.
- Increasing the environmental awareness of facility managers, tenants and clients will result in a cleaner environment.
- Improving the physical plant will result in fewer “trouble” calls from unhappy tenants.

Implementation of this plan can also:

- Establish Tennessee as a leader in accomplishing energy efficiency at government facilities
- Spur economic development in urban areas
- Fuel economic growth by converting energy savings into local jobs and other community investments
- Reduce pollution and demand on existing power plants
- Prepare Tennessee Government for de-regulation of electric utilities
- Provide national recognition to Tennessee by sharing what has been done with others nationally through our partnership with U.S. DOE and EPA (Tennessee is the first state with an action plan for its buildings)

State Building Energy Management Partnership Agreement

SBEM Agrees to:

- Assign a Representative who will aid the Partnership agency in the development and implementation of energy efficient project identification.
- Coordinate program resources among all partnership agencies, US DOE Rebuild America, and EPA Energy Star Buildings.
- Promote exchanges of information and provide guidance, programs, workshops, and training opportunities.
- Support peer exchange conferences to aid in replicating successes throughout the State of Tennessee.

Partnership agency agrees to:

- Support and participate in, the State Energy Action Plan.
- Prepare and submit an action plan for your agency including measurable goals and objectives that supports the State plan.
- Identify an energy management coordinator to represent the agency in these efforts with the SBEM.
- Provide routine follow-up information to the State Building Energy Management Program on project status, savings achieved and plan status.

By signing below, this agency accepts the Tennessee Action Plan agreement with the State Building Energy Management Program. This form should be signed by the agency's chief executive officer, or another senior officer who has the authority to commit the organization's resources.

EXECUTIVE ACCEPTANCE

SIGNATURE

DATE:

NAME:

TITLE:

AGENCY:

PHONE:

ADDRESS:

FAX:

Additional Contact: *(main point of contact for this program)*

NAME:

TITLE:

AGENCY:

PHONE:

ADDRESS:

FAX:
